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A NEW

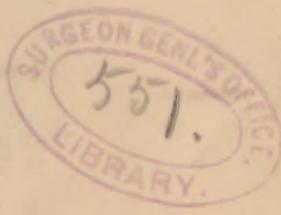
SCHOOL PHYSIOLOGY.

BY

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FIG. 84.—THE GREAT SYMPATHETIC NERVE.

1, 2, 3, ganglia in the neck; 4, spinal ganglia; 5, branches in neck and chest going to heart; 6, nerves to heart; 7, nerves about diaphragm; 8, nerve to digestive organs; 9, semilunar ganglion; 10, 11, 12, masses of nerves to abdomen; 13, small nerves going with arteries to brain. Dotted lines indicate the position of *a*, the heart, and *b*, the diaphragm.

lungs. The right auricle receives the blood, and sends it into the right ventricle, which forwards it to the lungs. The left auricle receives the blood from the lungs, and the left ventricle propels it into large vessels, called *arteries*, to be distributed. As a rule almost without exception, the vessels that carry blood to the heart are called the *veins*; those which carry it in an opposite direction the arteries. The left side of the heart, having a greater amount of work to perform in the propelling of the blood through the whole system, has much thicker walls than the right side. The muscular walls of the ventricles on both sides are thicker than those of the auricles, as the duty of the former is to propel to a greater distance.

The Greater and Lesser Circulation.—The right heart, from its containing

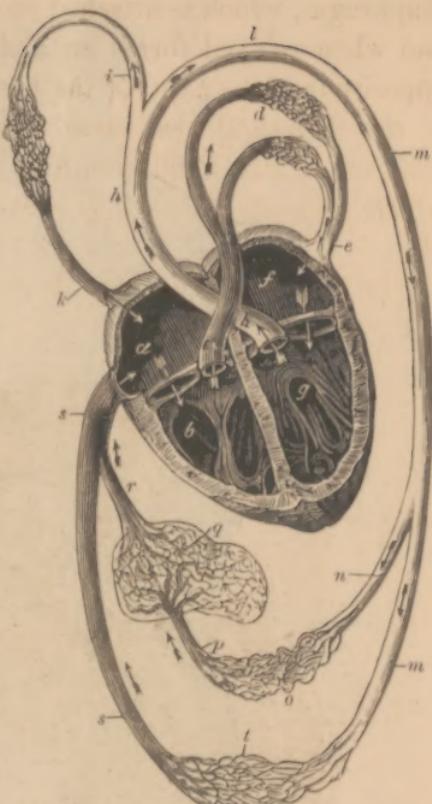


FIG. 57.—THE HEART AND ITS CAVITIES.
(Showing lesser and greater circulations.)
a, right auricle; b, right ventricle, communicating through auriculo-ventricular opening; c, pulmonary artery, showing branches to each lung; d, capillary vessels of lesser or pulmonic circulation; e, pulmonary veins; f, left auricle, and g, left ventricle, communicating through left auriculo-ventricular opening; h, aorta; i, arteries; k, upper vena cava, bringing blood from upper portions of body to right auricle; l, arch of aorta; m, its descending portion; n, arteries of stomach and intestines; o, capillaries of intestines; p, portal canal; q, capillaries of portal system in liver; r, veins of liver; s, lower vena cava, bringing blood to right auricle from abdomen and lower portions of body; t, capillaries of greater or systemic circulation.

diaphragm, which is attached around the base of the chest, and when relaxed forms an arch, the middle of which is opposite the lower end of the breast-bone. All the muscles of the chest and also those of the abdomen take part in respiration, and, when breathing is rapid and excited, those which raise and lower the ribs are especially called into play.

The Lungs.—The lungs are so arranged as to give a very

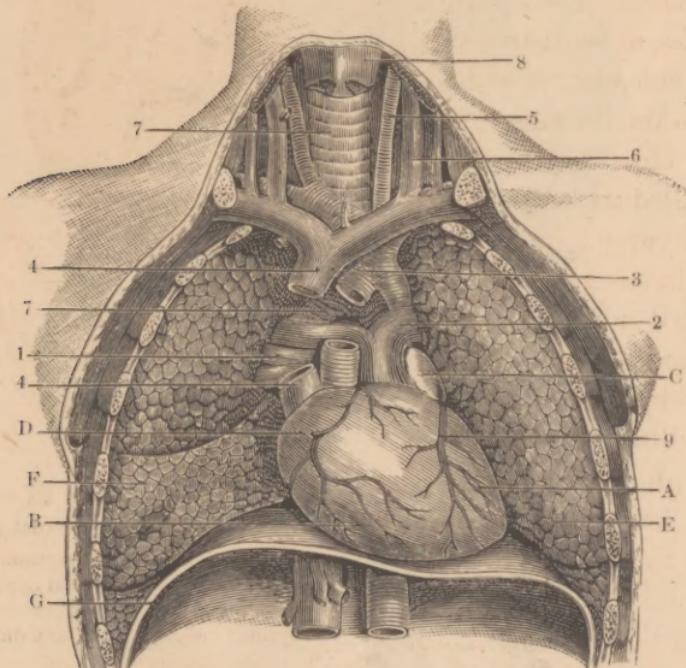


FIG. 49.—LUNGS, HEART, AND DIAPHRAGM IN POSITION.

- 1 pulmonary vein; 2, pulmonary artery; 3, main artery from heart; 4, vein; 5, carotid artery; 6, jugular vein; 7, windpipe; 8, larynx; 9, coronary artery; A, B, C, D, heart; E, F, lungs; G, diaphragm.

large surface for the contact of the blood and the air, and to do this to the best advantage each of the very small bloodvessels is completely surrounded by air. The lungs are divided into smaller portions, called lobes—the right

a larger quantity is poured out. It was found by experiment on horses that 400 parts of saliva were mingled with every 100 parts of hay, but only 50 parts of saliva were furnished when 100 parts of green stalks and leaves were taken. The saliva softens and moistens the food, and con-



FIG. 22.—SALIVARY GLANDS.

1, parotid gland ; 2, sublingual gland ; 3, submaxillary gland ; a, nerve ; c, d, e, muscles of face and neck ; f, lower jaw ; g, artery.

verts the starchy matter contained in it into a gummy substance called dex'trine, and afterward into grape-sugar. This, being soluble, is more easily absorbed. It seems that this power depends on the admixture of the mucus of the mouth with the saliva. Perfect mastication, or division of the food, and perfect insalivation are necessary to ensure perfect digestion in the stomach. The structure of the salivary

ivory balls be suspended by strings parallel with one another, and the last one of the series be raised and allowed to fall against its neighbor, the shock will be communicated through all the balls, and the first one in the row will fly off at a tangent. If, however, one, or perhaps two, porous balls be placed in the row, and the last ivory ball be again brought into contact as before, the force of the blow will be so greatly broken that the first ball will probably remain stationary. The elastic cartilages between the spinal bones yield so much to pressure during the day that a person is actually shorter in stature at night than he is in the morning after a night's rest has restored them to their natural condition.

The relative positions of the spinal column, the skull, and the chest are seen in Fig. 6. It will be noticed also that the spinal column is firmly planted between two large and irregularly-shaped bones, called the *pelvic* or *nameless bones*, because they have no special resemblance to any familiar

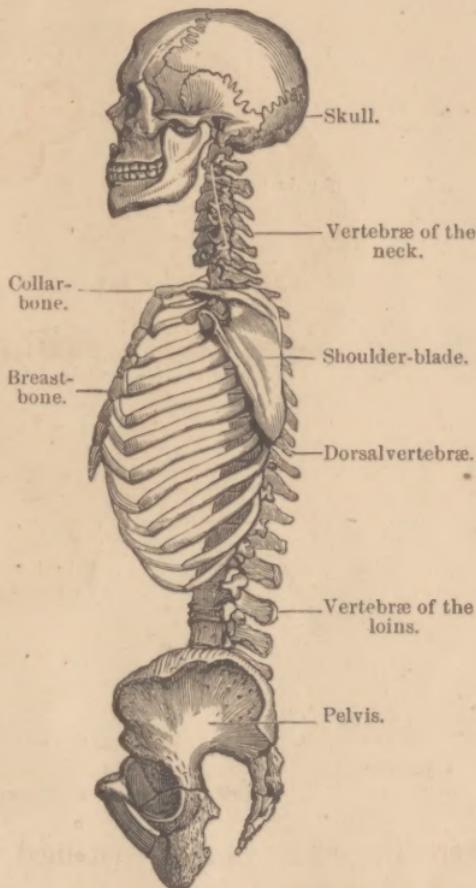


FIG. 6.—SKULL, SPINE, ETC.

OPINIONS OF THE PRESS.

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"A book of this nature from the son of Robley Dunglison seems peculiarly fitting, and, for the purposes intended, the work is worthy of the genial author. The plan of the work is common sense, and reminds one of Lewes' Physiology of Common Life, which is perhaps the highest praise we can give. To resemble that peer among physiologists is a credit indeed, and speaks volumes in favor of the good sense of the author in giving such a book as even children can understand. It only remains for us to say that we endorse this as the best work on human physiology for common schools which we have met with in the English language."—*The Monthly Review of Medicine and Pharmacy*.

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